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[Reference Carl Geiger]

A Context for First-Generation PC Art

Times and Aesthetics in the Early Days of the Personal Computer: 1970s – 1980s.

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Bio:

Robert was one of the first to use personal computer programming to practice art. His computer-based work includes Memory Theatre One (1985), Living Cinema (1988), Sand, or How Computers Imagine Truth in Cinema (1994), and Memory Theatre Two (2003). Robert holds an MFA from Syracuse University's College of Visual and Performing Arts. He grew up in Cocoa Beach, Florida during the birth of the NASA Space Program and presently lives in Silicon Valley. Robert is presently preparing a DVD-ROM to accompany a book on the history of Memory Theaters with German Historians Dr. Kirsten Wagner and Dr. Peter Matussek.

Abstract:

In this article Robert Edgar details the aesthetic, economic, technological and personal contexts involved with being an early adopter of personal computer programming as an art form. Economics played a central part for many of the early personal computer artists, and the price of film was influential in Robert's transition from filmmaking to computer programming after moving to Silicon Valley in the late 1970s. Moving to Atlanta in 1985, he joined Art Com, a virtual computer art community through the Well, which provided a platform for early PC art distribution. Robert's work in the next decade included Memory Theatre One (1985), Living Cinema (1988) and Sand, or How Computers Imagine Truth in Cinema (1994).

Establishing an Aesthetic: Backgrounds in Film and Video, 1970s

While attending art school at Syracuse University in the early 1970s, I'd hitchhike down to see my high school friend Robert Polidori in New York City, who worked at the newly-opened Anthology Film Archives. At Anthology he'd screen picks from the archives for me, including works by Harry Smith, Gregory Markopoulos, Michael Snow and Stan Brakhage.

I was especially attracted to the aesthetic materialist strategies common to many of these films. Through abstract expressionism and contemporary film there was a focus on the sensuality of the medium itself, avoiding the usual focus on content and acting. With film, there is the light burning into the emulsion, the chemical curing of the film, the physical scraping and cutting during editing, the subsequent resequencing of the exposures, and the optical printing and juxtapositions available through post-production. All of these could be and were used as compositional strategies teasing something unique from the medium out to your senses. Once such a formal compositional strategy is isolated in an artwork, it becomes part of the content of the world; through a reversal of the direction symbolism is usually conceived.

The anthropologist Clifford Geertz ⁽¹⁾ once wrote about a calendar the Balinese had that told the quality of the time, instead of just the quantity. It consisted of many "loops" of different lengths of time, from a few days to many years. The quality of any one day was described by the particular nature of the combination from the loop that happened to be juxtaposed on that day.

Well, this was a fantastic idea. First of all, it reminded me of the conceptual systems of Ramon Lull, whom I'd read about in "The Art of Memory" by Frances Yates ⁽²⁾. Lull conceived of different-sized wheels of symbols, again juxtaposed by their chance coincidence at any one point. This was a machine for generating meaning from symbol systems captured from the world. So there was Lull, there were the Balinese, there was Eisensteinian montage, and then there was this systematic approach to art making that was all over New York: Steve Reich's audio loops,

systematic duration modulation, microphone swings and phase shifts...and so the idea of an art presentation that could tell the time *and* quality of the day!.

I had an eight-millimeter projector into which I could load three film loops of differing lengths at one time, and project through all of them to show continual recombinations. My wife, friends and I would start up a set of loops, put on some sympathetic music, and watch as the snow swirled around in the Syracuse winter.

Early Glimpses of Computers and Art—1975-76

At Synapse—the 1970s Syracuse video collective that spawned Bill Viola and where I taught early courses in video art—Carl Geiger purchased one of the first Altair computers. He generated non-objective stills by entering programs using nine flip switches: eight to define a byte, and one to enter it into RAM. There was no storage, so he had to enter your program each time you wanted to run it. Carl would run the computer output through the Synapse video switcher to play hell with the video synch pulses and keying voltages, and capture the output with a still camera. Occasionally we'd drag the school Moog Synthesizer from Franklin Morris' electronic music classroom, where we'd try modulating the switcher and colorizers with the Moog output.

There was also Judson Rosebush, later to provide technical assistance for making Disney's Tron. Jud made stacks of punch cards, and fed them into a mainframe usually reserved for analyzing the results of behavioral studies for the Psychology department. He typed up graphic commands, parked a Bolex in front of a tiny screen, and still-framed geometric plots to create short animated films.

Bill Etra stopped by Synapse, showing us a first glimpse of an almost-practical video effects system he'd created. It would perform wipes and mortises by controlling the synch voltages. The output of his system was to a small video screen, and while his early system couldn't be recorded directly to tape, it showed where this type of experimentation was going, and that it would make money.

I saw computers at the time as promising, but I thought you had to put too much work into them in order to get something out. My aesthetics were built upon capturing and modulating. Film and video, for me, were first subtractive—where you captured images from the world—and then manipulative, where you edited and modulated what you’d captured. I didn’t see where the computers around me had enough capturing, so I stayed with film and video.

A Couple of Short Teaching Gigs

In 1977, I taught for a semester at University of South Florida (USF) in Tampa, replacing filmmaker Will Hindle while he recuperated from a heart attack. Stan Vanderbeek had just left USF. He was legendary for going to army surplus stores and pawnshops, finding old junked cinema-ish hardware and purchasing it for the school. He’d fill up rooms at USF, but it was a one-way trip for the equipment--he rarely did anything with it. It reminded me of visiting Canal Street in NYC and buying camera and projector parts. With USF Stan found a patron for supporting such a habit.

I couldn’t find a permanent college teaching job, so I ended up working with psychologist Bill Deterline, creating self-paced training courses for “Beseler Cue/See” teaching machines.

The Beseler was “interactive”, but the process of developing content for them was long and expensive. They had a super-8 film cartridge inside, along with an audiocassette and a microprocessor. The student watched a screen, listened to the audio, and when prompted, clicked one of four buttons to answer multiple-choice questions. Well, the interactivity was a bit light, but for the time it was seminal.

Switching Technologies: The Early 1980s

Working for Deterline got my wife and me out of Florida and into Silicon Valley by 1978. Work had me traveling, and I brought my Beaulieu with me. I continued making my own films, funding them on a rather slender salary. \$500 for an answer print was a long savings push, and at that price I didn’t feel I could afford more than one. Then, in 1980, the Hunt brothers tried to corner the silver market, and the price of film rose so far that I couldn’t afford film stock.

Around 1982, Sinclair put an ad in Scientific American for a small, inexpensive personal computer—the ZX-81. I could handle the cost. Once I paid for a computer, I could produce work for free—costing only the time it took to program it. Worked for me.

Now armed with 16 K of RAM, a cassette recorder for application and data storage, and a demented book on Sinclair BASIC, I set out to see what I could do. The results were two small animations: The Pads (2' 20", 1982) and Amphibian (4'30", 1982). I showed these in a faculty show at New College of California, where I taught filmmaking and aesthetics. While I still wasn't able to capture images, this was interesting. It was time to switch.

My friend and mentor Neal Margolis showed me an authoring language called GraForth. It had a perverse but efficient syntax that was appealing, and its author Paul Lutus had done an incredible job of providing the ability to produce animated 3-D graphics and music that played on the 1-mhz Apple II. I sold my Beaulieu and bought an Apple IIe.

Music and Adventure

I'd played guitar since I was 12, but traveling for Deterline I bought a mandolin so I could carry an instrument with me on airplanes. My wife and I caught a concert in Marin at this time: David Crosby and the David Grisman Quintet. Watching Crosby fumble around and then hearing Grisman's band scorching the air showed it was time to leave the '60s and '70s behind for a new California. Neal brought a guitar into work one day and we ended up putting a newgrass band together.

One of the musicians was Warren Robinett, who had done some interesting stuff at Atari programming the first visual adventure game. An adventure game had the player hunting through rooms and spaces looking for objects. We sat in a Palo Alto sports bar one night while he explained what he'd done and what he was presently programming: a "construction set" to help seven-year-olds learn logic. This became *Rocky's Boots*.

I asked if he'd ever heard of Michael Snow. Nope. I lent him "Cover to Cover"⁽⁴⁾ one of my favorite pieces, and he was deeply unimpressed. But now I knew what to do with a computer.

New Work in a New Medium: Memory

Theatre One

Using a computer I could create architectures containing images with texts that explicated them. This was a perfect medium for realizing the medieval memory theatres in Yates' book. Of course, when Giulio Camillo's *L'Idea del Teatro dell' eccellen* was published in 1550, philosophy consisted of the creation of closed and perfect systems, with simple geometries and arithmetic steps. Today, our universe was leaky and our concepts "always already" perforated. I didn't believe I could deliver a closed cosmology. But I could capture texts and illuminate images.

I contrasted found texts and personal musings. A two-story ring of twelve pairs of rooms, through which the viewer could wander, viewing images and reading texts.

To juxtapose a text and a still image, and to do it with impact, the text would have to be short. But I wanted to include longer texts too. So I added a library, where the viewer could read longer selections.

I added an element of aesthetic materialism that I thought was unique for the medium. As the viewer "ego" moved from room to room, s/he received the form of an icon, to be maneuvered using a joystick... There was a different icon for each room-pair, for a total of twelve. I then added one more room, an "Additive Memory Room". From my Memory Theatre One documentation:

"The Additive Memory room holds a cross-sectional representation of the Room Ring. The twelve "stamps" arranged on the clock face are the result of **exmode** overprinting of all the room icons **except** the one it represents. The resulting stamp exhibits the differential pattern of all the overprinted icons... somewhat analogous to the differential pattern on an exposed holographic film.

"The ego in the Additive Memory Room is the result of over-printing all of the 12 icons in exmode. When you move the ego over one of the stamps, the difference—which becomes visible—is the missing icon."⁽⁵⁾

Exmode printing was a logical method for combining the pixels of images when one is “printed” over another. If you use it to print two images, the resulting image is the difference between the two.

So I constructed an icon for each room consisting of all the room icons except for the one that represents that particular room. For the icon in the Additive Memory Room, I used exmode printing to create an icon that was the difference of all twelve. It should be pointed out that all of these Additive Room icons looked like the snow on a television screen: apparently random black and white dots.

When the viewer moves the comprehensive icon over the icon for a particular room, the exmode printing then produces the missing icon. The room’s symbol referred to exactly the icon that was NOT present in the room. This seemed like a perfect sculpture for representing the relationship between inside and outside in 1985, when I completed Memory Theatre One.

Support for a New Art Form: ArtCom and the Well

I’d lived in the bay area for about seven years, but hadn’t contacted other local artists who were exploring aesthetics with personal computers. When I moved to Atlanta in March of 1985, Memory Theatre One was almost finished. I met Lisa Frank in Atlanta, who put me in touch with her sister Nancy Frank, then partnered with Carl Loeffler of ArtCom...in San Francisco! Now Carl was someone I should have met years earlier.

I sent him a copy of Memory Theatre, and he was instantly enthusiastic. Carl had just gotten ArtCom up on The Well; an early online community hosted in Marin County and set up by Stewart Brand. Carl had focused for a few years on video and performance art, and now was shifting to computers and networking. Anna Couey was working with Carl at the time, and wrote of Memory Theatre One “It changed my notions about art forever”⁽⁶⁾.

Fred Truck had joined Carl to provide systems administration help for the Well. He was collecting correspondence art projects that he would perform, calling the collection “The Performance

Bank”. He wanted to publish the collection, but found that it was expensive to do an acceptable job of it. Like me, he turned to personal computers.

His first interactive work was a fine one: The Illustrated Art Engine. Fred wrote a list-oriented program that compared two files—either text or graphic files—and, using a programmable analysis of their attributes, synthesized a third file. Fred saw that what the computer allowed was a new way to get behind the brush...not behind the handle manipulating paint-like effects, but behind the wet hairy end, playing around with the logic of the image formation itself. Like Lull, Fred designed an engine of creation that would tell him about the nature of things.

Judy Malloy decided to use personal computer databases as formats for narratives. You want to find out what’s happening...search the database! This cleanly conceived approach led to many works, including “Uncle Roger” and her “Bad Information” databases. There have been people since Judy to create computer-based narratives, but Judy was the original.

Sonya Rapoport used computers to collect information on how viewers would interact with her installations, and then used the collected data to generate printouts. The printout scrolls, some of which would be huge, would provide both an accounting of the interactions and a graphic representations. Participants in Sonya’s events would take home printouts “as a reward.”⁽⁷⁾ To me it seemed as though Sonya was a mix between Marcel Duchamp and the anthropologist Claude Levi-Strauss, collecting sometimes humorous data and generating tables, reports and graphs that gave form to—what? For Levi-Strauss, it was the underlying form of culture itself.

Something that was different then from today was that most people who had spent the time to learn how to use computers had not also spent the time studying and developing aesthetics. Conversely, most of those who had studied and/or practiced aesthetics had not spent the time learning how computers worked. Computers had not yet become ubiquitous, and mastering them required a rather long, dry dedication.

Technology from Work

In Atlanta I started a digital media company with Mitchell Bring, who sold Georgia Power on creating a marketing room built around a visual database modeled after the Aspen Project demo that MIT produced a few years earlier.

The idea was to provide a way for companies who might move to Georgia to tour available cities, sites and existing buildings. We created an interactive map system, allowing a viewer to use a touch screen to jump to any major city or town in Georgia and view short video clips about the local economy, work force, quality of life, schools, infrastructure etc. The viewer could look through a complete mapping of Georgia USGS maps at various scales. There were also drive-throughs of industrial parks, where the viewer could touch a building in the park and see images of it, read data about who owned it, local infrastructure, asking price etc. All of this tied into a current database of industrial buildings available in Georgia.

Previous to this system, Georgia Power had a company fly down to Atlanta, then they loaded everyone into a helicopter and spent several days flying among sites. With this system, the company representative would fly to Atlanta and spend half a day using the system to tour available sites. Then they would fly to the top couple of sites for a personal look. Our company ended up developing systems for economic development organizations throughout the world.

I was introduced to Truevision's Targa video-capture technology through our work developing the Georgia Power system. The Targa was one of the first video capture boards. Our system used an array of videodisc players to hold all the video. We used the Targa board to overlay videos with graphics.

At Last—Adding Capture to the Computer

After developing Memory Theatre One, I still wanted badly to work with captured images. The Targa board provided the bridge between video and computing. There was another aspect I wanted to change too.

While I'd used 3-D animation for moving between the Memory Theatre One rooms, the rooms, for the most part, were static. This architecture was analogous to the relationship among film frames, and the transitions were like film splicing. But I wanted to move beyond that—my mental metaphor was of data streams that I would preload and turn off, on, and modify in order to create a mis-en-scene—I wanted to populate the rooms myself. Again looking at Eisensteinian montage categories, I wanted to add a new one, based on making choices in real time. I wanted to make a cinema-instrument that I could play like I played my guitar.

My Memory Theatre One was well reviewed, and I was able to put together a good case for a grant for funding creation of my Living Cinema system. The Atlanta Council of the Arts gave me \$14,000 to be used for creating my system, money from heaven. I was able to purchase all the software and hardware I needed for \$12,000, and I took the rest back and told them to give it to another artist who needed it. I don't think they had seen that type of behavior before, but I was extremely appreciative of the grant, and had what I needed to do what I needed to do. Now all I needed was to learn how.

Having taught myself Forth to program Memory Theatre One, I set about learning C. The engineers I worked with at Still Current Design graciously helped me learn. One of them also helped me with some assembly language for controlling a video disc.

By 1988 I premiered an early working system at the Image Film and Video Center in Atlanta on two small video screens for a standing-room only crowd. Oops. In about six months I held another showing, this time with a full projection system, performing with local artist Dutch Knotts, who used a new audio sampler. We had worked out a few pieces together, but mostly we improvised, one playing off the other. I performed with Living Cinema-- often with Dutch--in several places, including Tisch School in NYC and San Jose State. Then I took a job with Commodore and switched to the Amiga.

Eventually people have to switch from one operating system to another. This is one thing for end users, but another for programmers. When you're programming digital media performance, everything changes when you move from one platform to another. They just don't behave in the same way, and you have to learn how to plan preloads, buffers, what low-level routines are available to you etc. I had moved from the Apple // to MS-DOS to the Amiga in a couple of years, and it was difficult to keep switching among platforms. Director didn't exist as such, and certainly nothing for real-time cinema creation. But with the Amiga evolved two new tools though: the Toaster and a multitasking OS.

I made a last cinema system using the Amiga, a video capture card, and an authoring environment. Since no one program could give me all the functionality I needed, I took advantage of AREXX, an inter-application language that allowed me to set up communications among several running concurrently.

As I performed with Living Cinema I did a lot of sitting and thinking about what was happening and what to do next. Performances had a fairly slow pace. That didn't bother me particularly, having watched plenty of slowly-unfolding "structural" films...having made several myself...and listening to the music of La Monte Young and Steve Reich. But I'd also heard some slowly developing live Moog concerts in the early 1970s. I'd had a feeling that the composer was considering what to do next, and that the tempo resulted from that contemplation.

I figured that instead of loading new files, I wanted instead to just change the flow of rushing data. I could turn things off and on, but I didn't want the system waiting for me to act.

Instead of a keyboard, I used a newly purchased MIDI pickup on my guitar as a controller. I used AREXX to pick up specific MIDI notes that would control the sources of audio, video and text. The data sources played through sets of sequences I had preloaded in the computer. I also had sounds preloaded, both musical and sound samples, and in the performance I played my guitar, triggering changes in the visuals as I went along.

Once more economics was to change my direction. I'd been at Computer Curriculum Corporation, and left to start a new company, Iconceptual. I couldn't use the Amiga, by then a dying breed, as a programming platform for business. While I was still involved with video, I needed to be able to distribute on popular platforms...and the Amiga wasn't that. I had to sell my Amiga system to buy a Macintosh. So I boxed all my custom hardware and software and sent it off to a buyer on the east coast, using the money to buy the "computer for the rest of us".

[\[i\]](#)

1 "Person, Time, and Conduct in Bali", Geertz, Clifford, in *The Interpretation of Cultures* (Basic Books, 1973)

2. Yates, Frances A., *The Art of Memory* (University of Chicago Press, 1966)

3. Fraser, J. T., *Of Time, Passion and Knowledge* (George Braziller, New York, 1975)

4. Snow, Michael, *Cover to Cover*,

5. Edgar, Robert, *Memory Theatre One Documentation*, 1985 Atlanta.

6. Couey, Anna and Malloy, Judy, "A Conversation with Robert Edgar", Art Wire, 1995, Berkeley CA.

7. Rapoport, Sonya, in an email to the author.